FLIGHT RECORDS OF SOME HYMENOPTEROUS PARASITES ACROSS DELAWARE BAY[1].

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Only on rare occassions is opportunity presented to acquire information on continuous over-water flight of insects. In 1936, a study of mosquito migration across Delaware Bay was made by means of New Jersey-type mosquito traps installed on four of the five lighthouses that mark the ship channel in the approximate center line of the Bay. This was reported upon by MacCreary and Stearns (1937)[3]; and, subsequently, data on leafhopper migration incident to this study were published by Stearns and MacCreary (1938)[4].

The present paper is concerned with hymenopterous parasites collected by the trap on Ship John Shoal lighthouse, which is almost midway between the Delaware and New Jersey shores, the distances being 3.2 and 3.3 miles, respectively. Most of our knowledge on the movement of these parasites is based on distances traveled in fields or orchards and not on sustained flights, such as are necessary over bodies of water. While the data on flight range included herein are not of recent origin, they are fully as valuable now as when obtained and it seems desirable, therefore, to make this information available.

The Ship John Shoal lighthouse has an open deck, and the trap was placed thereon and secured to the deck plates by means of weights. It was approximately 20 feet above mean low water.

The light was visible for a distance of nearly 15 miles at a point 15 feet above sea level. The white sector, rated at 20,000 candle power, was beamed toward Delaware; and the red sector, at 6,000

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[3] MacCreary, Donald and L. A. Stearns. Mosquito Migration Across Delaware Bay. Proc. 24th Ann. Mtg. N. J. Mosquito Extermination Assoc., March, 1937, 188–197.

[4] Stearns, L. A. and Donald MacCreary. Leafhopper Migration Across Delaware Bay. Jour. Econ. Ent. Vol. 31, No. 2, April, 1938, 226–229.

candle power, toward New Jersey. The light was set for a cycle of four seconds on and two seconds off.

It had been planned to operate the trap each night from dusk to dawn during the months, May to September, inclusive. However, a severe northeast storm in mid-September swept the trap overboard; consequently, it operated only 134 of the intended 153 nights. Wind direction records, both evening and morning, made by lighthouse personnel indicated that on a majority of nights the wind was from the Delaware side of the Bay. These are in agreement with those of the Weather Bureau for 1936, which show that, as usual, the prevailing wind for this area is from the southwest during the period mentioned above.

The 16 parasites collected, with the dates and numbers in each

Table 1. Hymenopterous parasites collected at Ship John Shoal Lighthouse by New Jersey-type mosquito trap, May–September, 1936.

Species[5]	Date and Number Collected
Meteorus vulgaris (Cresson)	July 11, (2) and August 24, (2)
Macrocentrus crambi (Ashmead)	May 8, (2)
Macrocentrus delicatus Cresson	July 29, (2) and August 24, (2)
Apanteles carpatus (Say)	August 14, (2)
Rogas aciculatus (Cresson)	May 24, (2)
Rogas terminalis (Cresson)	May 8, (6); July 17, (2); and July 21, (2)
Rogas n. sp.	May 12, (1)
Netelia sayi (Cushman)	May 8, (2)
Gelis sp.	May 15, (1)
Melanichneumon soror (Cresson)	May 8, (1)
Diradops bethunei (Cresson)	August 23, (2)
Lathrolestes sp.	May 8, (3)
Cremastus epagoges Cushman	May 8, (2)
Cremastus sp.	July 30, (1)
Xyalaspis sp.	August 20, (1)
Pseudisobrachium sp.	August 22, (2)

[5] Determined by specialists at the U. S. National Museum, Washington, D. C.

case, are summarized in table 1. While six can be listed by genera only, nevertheless it seems advisable to include them.

Several species are important parasites of crop, household, and woodland pests in the Delaware-New Jersey area. For example[6], *Meteorus vulgaris* has been recorded from the fall armyworm, alfalfa caterpillar, cabbage webworm and the clover, dingy and variegated cutworms. *Macrocentrus delicatus* is active in controlling the codling moth, European corn borer, and oriental fruit moth. *Apanteles carpatus* attacks the casemaking and the webbing clothes moths. *Rogas terminalis* is one of the natural enemies of both the armyworm and the fall armyworm; *Netelia sayi*, of the corn earworm or tomato fruitworm; *Melanichneumon soror*, of the yellow woollybear and fall webworm; and *Diradops bethunei*, of the variable oak leaf caterpillar. *Cremastus epagoges* is a common form, recovered frequently from such locally destructive insects as the codling moth, oriental fruit moth, and Nantucket pine moth.

It will be observed that the genus *Apanteles*, a large group, is represented by but a single species, while *Rogas*, a relatively small one, contributed three. No conclusions are warranted from the data presented herein. They are being published simply to record the fact that the species listed are able to make over-water flights exceeding three miles. Futhermore, it must be emphasized that these parasites were attracted by a strong light and that the trap, which captured them, operated only from dusk to dawn.

[6] Reference—Muesebeck, C. F. W., *et al.* Hymenoptera of America North of Mexico, Synoptic Catalog. U. S. D. A. Agri. Monograph No. 2, April, 1951, 1–1420.